

Testimony of
Mr. Dereck Orr
Program Manager, Public Safety Communications
Systems

National Institute of Standards and Technology
Technology Administration
U.S. Department of Commerce

Before the
The Subcommittee on Emergency Preparedness,
Science, and Technology
Committee on Homeland Security
U.S. House of Representatives

"The State of Interoperability: Perspectives on Federal
Coordination of Grants, Standards, and Technology"

April 25, 2006

Thank you Chairman Reichert and Members of the Committee, I serve as the Program Manager for Public Safety Communications Systems in the Office of Law Enforcement Standards at the National Institute of Standards and Technology (NIST). NIST a non-regulatory agency within the U.S. Commerce Department's Technology Administration serves industry, academia, and other parts of the government by promoting U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.

NIST's public safety communications program serves as the technical lead for several Administration initiatives focusing on communications, most importantly the SAFECOM Program. NIST is involved in many of the key SAFECOM initiatives, including the Statement of Requirements, Public Safety Architecture Framework, testing and evaluation, and standards development. The strong partnership between SAFECOM and NIST is an excellent example within the Administration of multi-agency coordination and collaboration, and is something for which we at NIST are very proud. In addition, NIST relies heavily on the world-class engineering expertise of the Institute of Telecommunications Sciences within NTIA.

I will focus the remainder of my remarks this morning on the state of standards for public safety communications systems.

Interoperability for public safety communications is defined as "the ability to share information via voice and data signals on demand, in real time, when needed, and as authorized." The public safety community expects that this level of interoperability will be available using equipment from multiple manufacturers, that they are transparent to the user, requiring little or no special knowledge of the system, and that they are not dependent on common frequency assignments.

Achieving this definition of interoperability is not possible without the existence of standards that will define how the various components of a public safety communications system will interoperate, regardless of manufacturer. In fact, I would venture to say that in the absence of standards, achieving this level of interoperability would not be possible.

Public safety users have recognized this for some time. Approximately fifteen years ago, representatives from local, state, and federal public safety associations and agencies joined together to address the absence of available standards. They did this for two primary purposes. First was to ensure that interoperability could be achieved, assuming the use of equipment from multiple manufacturers. Second, through standards, the public safety community wanted to be able to take advantage of cost reductions associated with a more competitive land mobile radio market.

Understanding the difficulty in specifying the complex operations of the various components of a land mobile radio system, the public safety community partnered with the Telecommunications Industry Association (TIA) to serve as the standards development organization (SDO) for this effort. Thus Project 25, or P25 as we know it today, was launched. A Memorandum of Understanding formalizing this relationship

created a Steering Committee comprised only of public safety and government representatives and invested the committee with the sole authority to designate a P25 standard.

A commonly misunderstood aspect of P25 is that it is comprised of a single standard. Instead, it is a suite of standards that specify the eight interfaces between the various components of a land mobile radio system (hand held to hand held, hand held to mobile unit, mobile unit to repeater, etc.):

- Common air interface: this interface defines the wireless access between mobile and portable radios and between the subscriber (portable and mobile) radios and the fixed or base station radios;
- Subscriber data peripheral interface: this interface characterizes the signaling for data transfer that must take place between the subscriber radios and the data devices that may be connected to the subscriber radio;
- Fixed station interface: this interface describes the signaling and messages between the RFSS and the fixed station by defining the voice and data packets (that are sent from/to the subscriber(s) over the common air interface) and all of the command and control messages used to administer the fixed station as well as the subscribers that are communicating through the fixed station;
- Console interface: this interface is similar to the fixed station interface but it defines all the signaling and messages between the RFSS and the console, the position that a dispatcher or a supervisor would occupy to provide commands and support to the personnel in the field;
- Network management interface: this interface to the RFSS allows administrators to control and monitor network fault management and network performance management.
- Data network interface: this interface describes the RF subsystem's connections to computers, data networks, external data sources, etc.;
- Telephone interconnect interface: this interface between the RFSS and the Public Switched Telephone Network (PSTN) allows field personnel to make connections through the public switched telephone network by using their radios rather than using cellular telephones;
- Inter RF subsystem interface: this interface permits users in one system to communicate with users in a different system, from one jurisdiction to another, from one agency to another, from one city to another, etc.

Until this past January, the last fifteen years had resulted in only one of the above P25 interfaces, the Common Air Interface that deals with the functions of the hand held units (i.e., walky-talky), being advanced to a level where it would help satisfy one or both of the goals of P25. The remainder of the interfaces had either remained undefined, or lacked enough specificity to allow for a common implementation of the interface; in other words each manufacturer's implementation of the interface would be different and proprietary thus resulting in systems that would not meet the "interoperability" requirements as defined by the steering committee.

I would like to emphasize that the Common Air Interface was a major step forward and extremely important. It provides a level of interoperability and competition in the hand-held market that was not available before. But, it alone cannot satisfy the definition of interoperability that the public safety community is calling for.

However, over the last year, through the concerted efforts of industry, public safety practitioners, and NIST, with the support of SAFECOM, the technical development of standards for the critical P25 interfaces has been greatly accelerated. Industry representatives, with key involvement by public safety practitioners, have dramatically increased the pace and scope of their standards development activities consistent with priorities set by Congress. As a result, significant progress has been made through the formal P25/Telecommunications Industry Association (TIA) standards development framework established by the P25/TIA partnership in 1993. Specifically, **the most critical P25 radio system interfaces have all been addressed**. Basic protocol standards that specify the functionality and capability of these interfaces have now been completed and have been, or are on the verge of being published. The adoption of P25 standards is now occurring within a time frame acceptable to public safety users, NIST and its Federal partners, and the manufacturers.

As of the March 2006 P25 meetings the following has been achieved to add to the existing P25 Common Air Interface:

- **Inter-RF Subsystem Interface (ISSI):** A draft ISSI standard was approved on January 11, 2006 for letter balloting as a TIA standard. TIA anticipates that the vote for publication will occur during a formal meeting on May 31, 2006. The public safety community can expect ISSI products to be available in 2007 (within approximately six months after publication of relevant standards in 2006 consistent with deadlines established by the P25 Steering Committee
- **Fixed/Base Station Subsystem Interface (FSSI):** A completed FSSI standard was approved on January 11, 2006 for publication as a TIA standard. The realization of a TIA standard for the FSSI is extremely important because this standard will result in the offering and procurement of interoperable multi-vendor equipment enabling direct control by the console and Radio Frequency Subsystem (RFSS) of fixed/base station equipment. The console functionality provided by the FSSI substantially mitigates the urgency for completion of the CSSI. The public safety community can expect FSSI products to be available in late 2006 (within approximately six months after publication of relevant standards in 2006 consistent with deadlines established by the P25 Steering Committee).
- **Console Subsystem Interface (CSSI):** Completion in January 2006 of a new TIA standard for the FSSI that enables direct basic console control of fixed/base station equipment now serves as the foundation for more comprehensive CSSI standards to be developed in the future. Further development of the CSSI will follow upon continued development of the ISSI and FSSI throughout calendar year 2006. The public safety community can expect CSSI products to be available in 2007 (within approximately six months after publication of relevant standards in 2006 consistent with deadlines established by the P25 Steering

Committee).

I can report that State and local public safety agencies are already referencing the above standards in formal requests for proposals (RFPs) to Industry and that manufacturers are in the process of adding these standards to future land mobile radio product lines.

Of course, it is not only important that the various P25 interfaces are completed in a timely manner, but that a mechanism exist to ensure that products built to the standard, meet all of the requirements of the standard.

Over the last two years, NIST, with funds from the Department of Homeland Security and the Department of Justice, has tested a number of the hand held P25 radios that claim to meet the available Common Air Interface Standard. Using the test procedures called for in the standard, NIST found that none of the available radios met all aspects of the standard.

As with many other standards developed through the private sector consensus process, the key to correct adoption and implementation by different manufacturers is a strong conformity assessment program. A conformity assessment program will validate P25 standardized systems through a set of agreed upon tests which will validate that the systems can interoperate among themselves, thus ensuring Federal grant dollars are being used appropriately.

NIST, with the support of SAFECOM and the P25 Steering Committee, is developing a P25 Conformity Assessment Program. NIST is preparing and documenting standardized test protocols for the most important aspects of the Common Air Interface Standard. The standardized test protocols will then be provided to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), which can accredit laboratories interested in offering these testing capabilities. These test protocols would go a long way in assuring the public safety community that the equipment being purchased meets the P25 standard.

NIST is working closely with the P25 Steering Committee and manufacturers to ensure that the test procedures are correct and that the results are accurate. In addition, not all aspects of the P25 common air interface will be immediately available for testing through this program. To begin with, NIST is focusing on some basic functional tests of the radios, which will allow us to get the Compliance Assessment Program up and running. We will then begin to add interoperability tests, as well as tests for more complex radio functions.

In summation Mr. Chairman, there are positive steps being taken by leaders within the public safety community, key federal programs, the Congress and industry to significantly change the current environment and move the state of standards for public safety forward. The last twelve months have seen significant progress in the development of critical P25 standards and the next twelve months will see even more progress made., In addition, by the end of this year, local, state, and federal agencies procuring P25 equipment will have a mechanism in place to ensure that the products they are purchasing

truly do what is called for in the applicable standard. In conjunction with the other efforts mentioned by the other witnesses, I am confident that we are making significant headway in the pursuit of communications interoperability.

NIST looks forward to working with this Committee, Congress, our federal partners, state and local public safety officials, and leaders in industry to make this happen. Again, I am honored to be here before this Committee today, and I will happy to answer any questions that you may have.